REPORT

VAPOR INRUSION DATA VALIDATION

Sauget Area 2
Sauget, Illinois

Prepared for
U. S. Environmental Protection Agency, Region 5
77W. Jackson Blvd. (SR-6J)
Chicago, IL 60604-3590

September 4, 2008

URS Corporation
1001 Highlands Plaza Drive West, Suite 300
St. Louis, MO 63110
(314) 429-0100
Project #21561683

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Glossary of Acronyms & Abbreviations

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

CV	Calibration Verification
CLP	Contract Laboratory Program
CM	Corrective Measures
COC	Chain of Custody
DQO	Data Quality Objective
GC/MS	Gas Chromatography/Mass Spectrometry
ICV	Initial Calibration Verification
ID	Identification
IEPA	Illinois Environmental Protection Agency
J	Estimated Value
LCS	Laboratory Control Sample
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
ND	Non-detect
%D	Percent Difference
%R	Percent Recovery
%RSD	Percent Relative Standard Deviation
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability and Sensitivity
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QCSR	Quality Control Summary Report
r	Correlation coefficient
R	Rejected value
RF	Response Factor
RL	Reporting Limit
RPD	Relative Percent Difference
SA2SG	Sauget Area 2 Sites Group
SDG	Sample Delivery Group
SIM	Selected ion monitoring
SOP	Standard Operating Procedure
TCD	Thermal Conductivity Detection
U	Non-detect Value (under the MDL)
UJ	Estimated Non-detect (under the MDL)
URS	URS Corporation
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOCs	Volatile Organic Compound
WP	Work Plan

The purpose of this investigation was to collect air samples to evaluate the soil gas vapor intrusion pathway as part of a Supplemental Investigation conducted at the Sauget Area 2 Sites in Illinois. This Validation Report discusses the laboratory analyses of air samples performed by Air Toxics LTD, of Folsom California. The field investigation was conducted by URS Corporation (URS). Field quality control activities such as sample verification that could have affected the data are also addressed. The data usability is assessed in this Report in support of additional data characterization for the site.

1.1 PROJECT DESCRIPTION

The existing soil data within the Sauget Area 2 Sites appears to be inadequate to use for a vapor intrusion evaluation. Based upon an evaluation of the potential alternatives to evaluate the vapor intrusion pathway, URS conducted a soil gas investigation in the vicinity of buildings near or within the boundaries of the Sauget Area 2 Sites. This investigation provided soil gas concentrations that were be used in the evaluation of vapor intrusion into buildings as part of the Human Health Risk Assessment for the Sauget Area 2 Sites. The investigation followed the procedures detailed in the *Sauget Area 1 Soil Vapor Intrusion Investigation Work Plan,* dated February 28, 2007. The samples collected as part of this investigation is listed in Table 1-1 of this report.

1.2 OVERALL PROJECT OBJECTIVES

The objective of the sampling was to provide soil gas concentrations that were used in the evaluation of vapor intrusion into buildings as part of the Human Health Risk Assessment for the Sauget Area 2 Sites.

2.1 QUALITY CONTROL ACTIVITIES

Document review activities took place prior to and concurrent with the field program implementation. Communication with the project manager clarified and confirmed the proposed sampling activities when conflicting information was encountered in the work plan document. The review and continuous communication assured that the samples collected during this program would meet prescribed project guidelines and satisfy the project data quality objectives (DQOs). Documentation of sampling activities and sample shipment chain-of-custody (COC) records were designed to confirm that all proposed investigation activities were completed as planned. Copies of the COC forms are presented in Appendix B of this report.

2.1.1 Document Review

Prior to the startup of field activities, the Soil Gas Investigation WP, the Quality Assurance Project Plan (QAPP), and the Health and Safety Plan were provided to the members of the field sampling teams for their review. This familiarized them with the site being investigated, the objectives of the investigation, and the SOPs under which the field activities were to be completed. Field personnel were briefed on the work to be completed prior to project startup. Coordination of the field sampling activities was maintained through open communication among project management personnel, the field sampling teams, and the analytical laboratories.

2.1.2 Equipment Decontamination

The equipment decontamination was completed by the laboratory. The 6 or 1-Liter Summa canisters were batch certified by the laboratory before being sent to the work site. Equipment decontamination was not required by the URS field personnel.

2.1.3 Sample Verification

During field activities, the field sampling team reviewed the QAPP to verify the sample collection requirements for each sampling location. The review included the verification of target analytes, sample container requirements and the quality assurance/quality control (QA/QC) sampling requirements. Information concerning the number and type of samples collected at each location was documented as identified in Section 2.2.2. Any questions or inconsistencies that arose during the field activities were directed to the URS Project Manager for resolution.

2.1.4 Field Equipment Calibration

Field equipment did not require calibration.

2.2 SAMPLE COLLECTION ACTIVITIES

Samples were collected for chemical analyses during the investigation in accordance with the field sampling procedures summarized in the Soil Gas Investigation WP. The samples were collected at the Sauget Area 2 Sites from September to October 2007. Table 1-1 of this Quality Summary Control Report (QSCR) summarizes the samples collected and includes sample identification, sampling date and time, sample matrix, and parameters analyzed for each sample.

Samples were submitted to Air Toxics, LTD in Folsom, California for all parameters.

2.2.1 Sample Containers, Handling, and Labeling

The samples were collected in certified pre-cleaned Summa canisters, sealed, and affixed with a canister sample label in accordance with the Sample Handling Procedures listed in SOP No. 25 (Sample Containers, Preservation and Holding Times). Samples were placed the box provided by the laboratory, and sample custody was maintained until shipment to the laboratory. Sample labels included the sample identification number, and the sample collection date and time as specified in Section 5 of the QAPP.

Sample information, such as identification numbers, targeted analytes, sampling times, and QA/QC sample types, was documented on COC forms for shipment to the analytical laboratory. Completed COC forms were signed and one copy of the completed COC form was removed and retained for the field and office files. URS St. Louis put the Summa canisters in the box provided by the laboratory, sealed the box, and shipped them via overnight delivery service to Air Toxics, LTD.

The analytical laboratories and URS were in contact regularly regarding the number and type of samples shipped. These conversations also allowed for the expedient resolution of any questions or discrepancies arising from previous sample shipments.

2.2.2 Documentation of Field Activities

Field logbooks were completed for the documentation of the field activities. All field activities and samples collected were documented in the field logbooks. Sample collection was also documented on the COCs.

2.2.3 Sample Designation

Samples collected during the Supplemental Investigation were labeled with unique sample identification as summarized in Section 4 of the QAPP. There was no transcription errors associated with the samples collected.

2.2.4 Field QA/QC Samples

QA/QC activities in the field included the collection of field blanks and duplicate sample pairs. The following sections detail the field QA/QC samples collected.

2.2.4.1 Field Duplicate Samples

Field duplicate samples were collected and submitted for analysis at an approximate ten percent frequency. Field duplicates were collected following the same procedures as the original samples. The field duplicates were submitted to Air Toxics, LTD as routine analytical samples.

Field duplicate results provided estimates for overall precision of sample collection, field sample preparation, and laboratory analysis. The duplicate sample data was used to assess the usability of the sample data. Field duplicates are identified in Table 2-1. The results of the field duplicate samples are discussed in the data reviews summarized in Appendix C of this Validation Report.

Field Blanks

Field blanks were collected and submitted to the laboratory with the investigative samples and analyzed for the same parameters as the investigative samples. Field blanks were collected from a certified air source in the field. Field blanks were analyzed to check for procedural contamination at the site which may have caused sample contamination.

3.1 SAMPLE DOCUMENTATION

Documentation of sample tracking is an important aspect of environmental investigations and is designed to maintain the sample integrity subsequent to sample collection.

The URS field crews were responsible for completing COC forms which described the sample identification, time of collection, sample matrix, analyses requested, preservatives (if required), and any additional comments. The COCs were placed in the boxes shipped to the laboratory. Upon receipt of the boxes, the laboratory reviewed each box and accompanying COCs. Copies of the completed COCs are presented in Appendix B.

The laboratory sent URS sample confirmations via e-mail. Some minor discrepancies were noted during the sample receipt. These issues were addressed immediately with the field manager and were corrected prior to the submittal of the data package. URS was contacted regarding an anomaly for samples received September 24, 2007. The "relinquished by" portion of the COC was not signed by URS before samples were shipped to the laboratory. All samples were received by the laboratory in good condition. No additional problems or discrepancies were noted. All issues listed above were resolved prior to analysis and did not impact project DQOs.

4.1 LABORATORY PROCEDURES

The samples collected during the Supplemental Investigation were analyzed following USEPA methods as summarized below. The associated QC review and data validation summaries are provided in Appendix C, respectively. The laboratory provided, in various batches, documentation for the methods listed below, including sample preparation, sample tracking, and documentation controls.

The data reported by the laboratory were reviewed and qualified accordingly. The qualifiers assigned are listed in Table 4-1.

4.1.1 Volatile Organics

VOC soil gas analysis was prepared and analyzed by USEPA Methods TO-15 and TO-15 selected ion monitoring (SIM). Method TO-15 utilizes gas chromatography/mass spectrometry (GC/MS) for separation and detection, respectively.

4.1.2 Oxygen

Modified ASTM Method D1946 is a gas chromatography/thermal conductivity detection (GC/TCD) method that was used for determining the chemical composition of reformed gases and gaseous mixtures. Samples were prepared and analyzed by following Modified ASTM Method D1946.

4.2 LABORATORY QA/QC SAMPLES

4.2.1 Method Blank

The method blank for the analysis consisted of is an unused, certified canister that has not left the laboratory. The blank canister was pressurized with humidified, ultra-pure zero air and carried through the same analytical procedure as the field sample. The blank was carried through each step of the analytical method to analysis. The method blank data were used to evaluate potential contamination contributed to sample preparation and analysis during normal laboratory operations.

4.2.2 Surrogate Spikes

Surrogate spikes are compounds added to every blank, sample, laboratory control sample, and standard when specified in the analytical methodology. The results are utilized to evaluate the accuracy of analytical measurements on a sample-specific basis. Surrogates are generally brominated, fluorinated, or isotopically labeled compounds not expected to be present in

environmental media. Results are expressed as percent recovery (%R) of the surrogate spike. Recoveries outside of criteria can indicate evidence of matrix interference or problems with internal standards.

4.2.3 Laboratory Control Samples

Laboratory control samples (LCS) are well-characterized, laboratory-generated samples and are used to monitor the laboratory's day-to-day performance of analytical methods. The organics LCS limits are based on ± three sigma and are updated every six months. LCSs are used to monitor the precision and accuracy of the analytical process independent of matrix effects. In some instances, the LCS is used to identify any background interference or contamination of the analytical system, which may lead to the reporting of elevated concentration levels or false positive results. The results of the LCS are compared to well-defined evaluation criteria to determine whether the laboratory system is "in control." Controlling laboratory operations with LCS, rather than surrogates or matrix spike/matrix spike duplicate (MS/MSD), offers the advantage of being able to differentiate low recoveries due to procedural errors from those due to matrix effects.

5.2.3 Internal Standards Performance

Internal standards, which are compounds not found in environmental samples, are spiked into blanks, samples, and LCSs. The internal standards are spiked into the GC trap at the collection time. Internal standards are used as a reference for calibration and for controlling the precision and bias of the analytical method. Internal standards must meet retention time and performance criteria specified in the analytical method or the sample would have been reanalyzed.

Section 5

The data review process, which involved a review of the laboratory summary data, was implemented to assess the quality of data resulting from the field sampling program with respect to the quality assurance objectives established for the project. In order to evaluate the appropriate usage of the data, in supporting decisions to be made, the data was evaluated with respect to data quality, major data uses, and the remedial decision to be made. Data that did not meet the criteria were qualified or discussed for the limitation on usability. In addition, approximately 10 percent of the data underwent a more comprehensive evaluation which included the review of raw data (i.e., chromatograms, run logs, etc.), recalculation of data, and sample tracking. For the purpose of this document, this extended review was termed full validation.

The following sections summarize the data review and data validation approach used for the Sauget A2 samples. In general, the review and validation followed guidance as presented in USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review (USEPA 1999), as applicable to USEPA analytical methods and method-specific criteria. As indicated above, the data review involved reviewing QC summary forms, whereas the validation additionally involved the review of raw data. Table 3.1 of the Sauget A2 QAPP (URS 2004) summarizes the data review/validation criteria in tabular format.

5.1 DATA REVIEW/VALIDATION ELEMENTS

Analytical laboratory results were reviewed following guidance presented in USEPA CLP National Functional Guidelines for Organic Data Review (USEPA 1999). The data were reviewed/validated using the QC criteria specified in the Sauget A2 QAPP (URS 2004). These guidelines were used as applicable to USEPA methods. Method-specific and established laboratory criteria were used for data assessment. Based on results of the data review/validation processes, sample data may have been qualified as **J** (estimated), **UJ** (estimated non-detect), or **U** (non-detect).

Although the data packages provided were not CLP deliverables, the CLP guidance was followed where applicable to USEPA methodology. The QC elements reviewed in laboratory analytical data packages included the following:

- Completeness of the data package
- Laboratory case narrative and log-in receipt forms
- Compliance with required holding times

- Presence of analytes in method blanks and field blanks
- Results of LCS
- Recoveries of surrogate spikes in samples
- Recoveries of internal standards
- Field duplicate samples
- Laboratory duplicate samples

The data validation included all of the items identified above and additionally included the items below:

- Instrument performance check samples
- Run logs review
- Chromatograms review
- Initial calibration
- Calibration verifications (CV)
- Retention time windows
- Analytical result verification

When a result was above the method detection limit (MDL) and below the reporting limit, the laboratory flagged data **J** to indicate that the concentration reported is an estimated value. The data, including all post-analysis qualifiers, are presented in the data summary tables in Appendix A. The data review and validation results are presented in Appendix C.

The data review and validation procedures used to evaluate the Sauget A2 data are described in this section. The QC review details quality control issues associated with the analysis of the samples, describes if the data required qualification.

5.1.1 Completeness of Data Package

Data packages were reviewed to make certain that they contained the data contractually required in the deliverable. This included checking the data package for the results of each analyte requested on each field sample submitted in the analytical batch, along with the requested QC documentation for the respective methods.

5.2.4 Sample Preservation and Holding Times

Sample holding times were calculated by subtracting the date of sampling, as determined from the COC forms, from the date of sample analysis. If the sample analysis was completed outside of the required holding times, data was qualified as estimated **J** (detects) or **UJ** (nondetects), or rejected **R**, depending on the severity of the exceeded holding time. The validation additionally included reviewing run logs and chromatograms to ensure the dates presented on the summary forms were accurate.

5.1.3 Blanks

Guidance provided in the USEPA CLP National Functional Guidelines for Organic Review was used for the evaluation of method blanks and field blanks. If analytes were detected in a blank sample, but not in samples associated with the blank sample, then data was not qualified. If analytes were reported in a blank and in associated samples, the following actions were taken:

- Positive sample results were reported without qualification when the concentration of the analyte in the sample exceeded 10 times (10x) the amount in a blank for common laboratory contaminants (methylene chloride, acetone, 2-butanone), or exceeded 5 times (5x) the amount in a blank for other compounds. Note: The 10x rule was only applied to method blank samples.
- When the sample results were greater than the reporting limit (RL), but less than the required multiple (5x or 10x) of the method blank result, sample results were qualified as non-detect **U**, and the RL was raised to the sample concentration.
- When the sample results were less than the RLs and less than the required multiple of the method blank result, sample results were qualified as non-detect **U** at the RL.

During the data validation, the chromatograms were reviewed to ensure all peaks were identified and explained. In addition, run logs were reviewed to ensure a method or preparation blank was analyzed with each batch.

5.1.4 Surrogates

Surrogates were used to assess accuracy for TO-15 and TO-15 SIM, analyses on a sample specific basis. Criteria for recovery of surrogate compounds spiked into samples are provided in Table 3.3 of the QAPP (URS 2004). For TO-15 and TO-15 SIM analyses, if any surrogate was out of specification due to recoveries greater than the upper evaluation limit, indicating a high bias, positive results for that sample were qualified as estimated **J**, and non-detect data were not qualified. If recoveries were below the lower evaluation limit, indicating a low bias, but greater

than 10 percent, positive results for that sample were qualified as estimated **J**, and non-detect results were qualified as estimated **UJ**. For any surrogate recovery below 10 percent, positive results for that sample were qualified as estimated **J**, and non-detect results were qualified as rejected **R**.

The validation additionally included recalculating the surrogate values from the raw data and reviewing the chromatograms to ensure the surrogate compounds were within the established retention time windows.

5.1.5 Laboratory Control Samples

LCS is well characterized, laboratory-generated samples used to monitor the laboratory's day-to-day performance for organic analyses, and to assess the accuracy and precision of the analytical process independent of matrix effects. Evaluation criteria for LCS are provided in Appendix A of the QAPP (URS 2004). Sample results associated with a LCS recovery below the evaluation limit were qualified as estimated **J** (detects) or **UJ** (nondetects) based on a potential low bias. If LCS recoveries were less than half the lower evaluation limit, sample results reported as non-detect were qualified rejected **R**. Detected sample results associated with a LCS recovery above the evaluation limit were qualified as estimated **J** based on a potential high bias. Data reported as non-detect were not qualified based on a LCS with potential high bias.

The validation additionally included reviewing extraction and run logs to ensure a LCS was analyzed with each batch. Approximately 10 percent of the LCS recoveries were recalculated using the raw data. In addition, chromatograms were reviewed to ensure the LCS compounds were within the retention time windows.

5.1.6 Field Duplicate Samples

Field duplicate samples were collected at a frequency of approximately 10 percent, as required by the Sauget A2 QAPP (URS 2004). Relative percent differences (RPDs) were calculated for each field duplicate pair. Precision evaluation criteria of 25 percent RPD for soil gas samples were considered if the analyte concentrations were greater than 5x the RL for both samples. For analytical results less than 5x the RL, for either or both samples, RPD evaluation criteria of ± 2x the RL were utilized. Duplicate results were evaluated on a case-by-case basis to determine if qualification of data was necessary. Where it was determined that qualification of field duplicate samples was required, associated data were qualified **J** (detects) or **UJ** (nondetects).

5.1.7 Instrument Performance Check (Data Validation Only)

The laboratory was required to analyze an instrument performance check sample every 12 hours of sample analysis. The instrument performance check sample summaries were compared to the method criteria. In addition, approximately 20 percent of the values were recalculated from the raw data. The laboratory was required to meet the method criteria prior to analyzing samples. If the laboratory did not meet the tuning criteria, the associated samples were qualified as **R**.

5.1.8 Run Log Review (Data Validation Only)

Review of the run logs involved reviewing the logs to determine that samples were analyzed as presented on the sample summary forms. The sample run logs were reviewed to determine that the correct sample volume was prepared, the appropriate QC samples (e.g., LCS...) were analyzed as part of the analytical batch, and the samples were analyzed in the method-required order.

5.1.9 Chromatogram Review (Data Validation Only)

This involved a review of each chromatogram to determine that peaks were within the acceptable retention time windows of the associated standard. The review also included comparing the analysis times presented on the instrument run logs to those presented on the sample chromatograms. In addition, the review identified all peaks present on the chromatogram as either: target analytes, internal standards, surrogates, or tentatively identified compounds.

5.1.10 Initial Calibration (Data Validation Only)

Each method required establishing an initial calibration curve. The data validation involved reviewing the percent relative standard deviations (%RSDs), the response factors (RFs) or the correlation coefficient ® if linear regression was employed. If %RSDs, RFs, or correlation coefficient ® were not met for an analyte, the associated data was qualified as **J**, **UJ**, or **R**, depending on the severity of the outlying data point. One analyte per internal standard was recalculated using the raw data.

5.1.11 Calibration Verification (Data Validation Only)

Each method required the analysis of CV samples to ensure the initial calibration was still valid. The data validation involved reviewing the percent difference (%D) of the RFs between the CV and the associated calibration curve. If the RF or %D criteria were not met for an analyte, the associated data was qualified as **J**, **UJ**, or **R**, depending on the severity of the outlying data. One

analyte per internal standard, or 10 percent of the data presented on the continuing calibration summary forms, were recalculated using the raw data.

5.2 MEASUREMENT OF QUALITY ASSURANCE OBJECTIVES

The measurement of quality assurance was determined by the assessment of precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS). The PARCCS definitions are included below and the PARCCS assessments are included in Section 8.

5.2.1 Precision

Precision is the measure of variability between individual sample measurements under prescribed conditions. Replicate measurements of known standards and the analysis of duplicate environmental samples assess precision. Evaluating the RPDs obtained from results of laboratory duplicate, and field duplicate samples assessed precision. The precision of the data is discussed in Section 8.

5.2.5 Accuracy

Accuracy is the degree of agreement between the measurement of a known sample and an accepted reference or true value. Evaluating %Rs for LCS samples, and surrogates assessed accuracy. The accuracy of the data is discussed in Section 8.

5.2.6 Completeness

Following the QC review and validation of the data packages for the site, the data were assessed with respect to the fulfillment of QA objectives and usability. The completeness for laboratory analytical data for the site was calculated by the ratio of acceptable (including estimated data) analyses requested on the samples submitted for analysis, to the total number of analytical results requested.

$$\%Complete = \frac{Number\ of\ Valid\ Analytical\ Results\ (including\ estimated\ J\ results)}{Total\ Number\ of\ Analytical\ Results\ Requested}$$

The percent completeness, with respect to overall project objectives for the Sauget A2 project, was evaluated for the data required in making decisions on a case-by-case basis. In general, samples critical to the decision process required a 95 percent completeness goal.

5.2.4 Representativeness

Representativeness is the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a parameter primarily concerned with the proper design of the sampling program (such as sampling location strategy) or sub-sampling of a given sample. Assessment of representativeness includes an evaluation of precision. Therefore, reviewing the precision of field duplicate samples collected from a site can assess representativeness of the analytical results, with respect to the medium sampled. Review criteria for field duplicate analyses are identified in Section 5.1.7.

5.2.5 Comparability

Comparability expresses qualitatively the confidence with which one data set can be compared to another. Data are comparable when collection techniques, measurement procedures, methods, and reporting are equivalent for all samples within the sample set. Section 8 contains a qualitative assessment of data comparability.

5.3.1 Sensitivity

Sensitivity broadly describes the RL established to meet the project-specific DQOs. The sample RL is the lowest concentration of an analyte present in a sample that can be quantified with a specified level of confidence. The RLs are a function of the sample characteristics, MDLs, and laboratory performance.

MDLs are determined by the laboratory and defined as the level at which the laboratory can reliably quantify the concentration of an analyte on multiple analyses. The RLs are greater than the MDLs because MDL studies are performed using laboratory-prepared samples (spiked zero air); whereas, environmental samples are naturally more variable. United States Army Corps of Engineers (USACE) requires that RLs are 3-5 times the MDL. MDLs and RLs are provided in Tables 1.4B through 1.4D of the Sauget A2 QAPP (URS 2004). For this project, data are reported below the RLs as estimated **J**. Factors that may result in elevated RLs are discussed below.

- High concentrations of target or non-target analytes may require that the sample extract be diluted to avoid saturation of the detector, or to quantify the analyte concentration within the calibration range of the instrument. Consequently, RLs are elevated in proportion to the dilution factor.

- Matrix interference may require that the sample be diluted to reduce or eliminate the interference. Consequently, the RLs are elevated in proportion to the dilution factor.
- The physical characteristics of the matrix do not permit concentration to the required final volume during sample preparation, resulting in a larger sample extract volume and, consequently, an elevation in RLs.
- Matrix interference may require the RLs be elevated because of the inability to quantify data below the elevated RL.

In a given sample, one or more of these effects may be exhibited. When the RLs have been elevated as a result of one or more of the above causes, surrogate or target compounds present at low concentrations may not be detected. Therefore, elevated RLs may cause limitations to the application of the data for its intended use. These limitations on data for contaminants of concern are discussed on a case-by-case basis.

5.3.2 DATA ASSESSMENT

The assessment of data involves the consideration of data uses, the identification of data which were qualified or otherwise deviated from the Sauget A2 QAPP requirements, and the limitations associated with the evaluation of data in supporting decisions to be made.

5.3.3 Summary of Data Quality Requirements

Data collected in the corrective measures (CM) must be of known quality to support the uses for which it is intended. Data must meet the minimum quality standards to be useful in assessing the chemicals of concern, if any were released from the site, the acceptable level of uncertainty, and the concentrations in environmental media of concern at potential exposure points. Additionally, RLs must meet the levels necessary to determine whether analytes are present at concentrations of concern (i.e., above relative background concentrations, regulatory standards, or risk-based concentrations).

Inherent in providing defensible data is the need for a QA/QC program. The QA/QC program must have measurement tools so that data collected will be of known quality and legally defensible. QA/QC objectives for sampling and analysis were developed for this project which uses the following as indicators: precision, accuracy, completeness, comparability, representativeness, and sensitivity.

5.3.4 Data Usability Assessment

A determination of data usability was made with respect to project DQOs. Sampling issues and data review/validation issues were discussed in terms of appropriateness of using the data as intended, as well as making recommendations or limitations on data usage. These discussions address items such as elevated RLs, analytes suspected as laboratory contaminants, potential bias in results, and professional judgment utilized in the data review/validation. The data assessment summary is provided in Section 8 of this QCSR.

The A2 sampling activities from September, 2007 to October, 2007 resulted in the collection of 32 soil gas samples, 3 field duplicate samples and 4 field blank samples. The sample results were submitted in multiple SDGs and are noted 709432 through 710169. The samples were identified for the following parameters VOCs by TO-15, TO-15 SIM and Oxygen. All samples were sent to Air Toxics, LTD in Folsom, CA.

Appendix C contains the data quality reviews for all samples. The data quality reviews have been organized by sample delivery group (SDG).

6.1 DATA QUALITY REVIEW CHECKLISTS FOR ALL SDGS

SDGs were reviewed for each parameter separately. Appendix C contains the detailed review checklists for each parameter. In addition, a list of qualifiers for each SDG is provided at the end of the subsequent checklists for that SDG.

7.1 INTRODUCTION

Appendix C summarizes the full validation reports for ten percent of the chemical data for samples collected during the 2007 Sauget A2 field effort. The validation was completed in accordance with USEPA CLP National Functional Guidelines for Organic Data Review (USEPA 1999), where applicable to USEPA Methods. Additionally, QA/QC criteria established in the QAPP (URS 2004) was used.

7.2 LEVEL IV VALIDATION OF DATA

SDGs were validated at a rate of ten percent for each parameter. Appendix C contains the detailed validation checklists from each parameter.

8.1 OVERALL DATA ASSESSMENT

Quality issues for the data were assessed to evaluate their affect on the major data uses. In general, the objective of the sampling event was to gather data sufficient to evaluate data usability in support of the Supplemental Investigation.

Based on the criteria outlined, all data have met the DQOs and should be accepted for their intended use.

Overall accuracy and precision, assessed by the analysis of LCS and surrogate compounds, was approximately 99.5 percent. Representativeness, assessed by the analysis of field blank samples and field duplicate samples was also acceptable. One hundred percent of the field duplicate results were within criteria. Completeness, defined as the percentage of usable data (data not qualified as **R**), was approximately 100 percent. Comparability was acceptable as samples were analyzed using the standard operating procedures throughout the project duration. Therefore, the overall PARCC parameters were acceptable. Sensitivity, and its impact on data usability, is included in the report.

8.2 SAMPLING ISSUES

No sampling issues impacted data quality. Section 3 summarizes issues and documents that impact to the project DQO's.

8.3 DATA REVIEW/VALIDATION ISSUES

For laboratory analytical data, QA objectives were specified in the Sauget A2 QAPP (URS 2004). The QA objectives were used as indicators of the quality of data necessary to support identification and quantification of potential chemicals of concern. The data was reviewed and validated as identified in the QAPP (URS 2004). While the data review assessed the data based on the QC summary forms, the data validation was completed to determine if a more extensive review of the data indicated noncompliance with the method SOPs.

As presented in Appendix C, analytical results for some samples were qualified as **UJ** or **J** to indicate the quality control associated with that data did not meet evaluation criteria; however, they could be used for decision-making purposes. Analytical results were also qualified as **U** due to field blank contamination. Appendix C summarizes all qualifications based on Data Quality Reviews and all qualifications based on Data Quality Validations.

8.4 APPROPRIATENESS

Analytical methodologies identified in Section 4 were utilized to help determine the presence of any chemicals of concern. With respect to the site description, the analytical methods utilized were appropriate to assess all chemicals of concern.

8.5 LIMITATIONS

Limitations occur when reporting limits have been elevated above the decision point, or data were detected below reporting limits (resulting in estimated data). The summary of analytical data presented in Appendix A identifies the reporting limits for each sample analysis, and the qualifications associated with the data. No limitations were identified. Table 6-11 summarizes all qualifications to the data based on the data review and validation procedures.

U.S. Environmental Protection Agency (USEPA). 2005. Test Methods for Evaluating Solid Waste Physical/Chemical Methods. SW846. Third Edition. Final Update IIIB.

U.S. Environmental Protection Agency (USEPA). 1999. National Functional Guidelines for Organic Data Review. USEPA Contract Laboratory Program. EPA 540/R-9/008. October.

Tables

TABLE 1-1

Summary of Collected Samples Sauget Area 2

SDG	Sample ID	Sample Date	Sample Time	Matrix	VOCs (TO-15)	VOC (TO-15 SIM)	Oxygen (Modified ASTM D-1946)
709432	VI-2-B	9/19/07	929	Soil gas	x	x	x
709432	VI-091907-FB	9/19/07	1042	Soil gas	x	x	x
709432	VI-2-D	9/19/07	1505	Soil gas	x	x	x
709494	VI-4-A	9/21/07	838	Soil gas	x	x	x
709494	VI-4-B	9/21/07	1007	Soil gas	x	x	x
709494	VI-092107-FB	9/21/07	1022	Soil gas	x	x	x
709494	VI-3-A	9/21/07	1412	Soil gas	x	x	x
709528	VI-3-B	9/24/07	846	Soil gas	x	x	
709528	VI-3-C	9/24/07	938	Soil gas	x	x	
709528	VI-4-C	9/24/07	1210	Soil gas	x	x	
709528	VI-4-C DUP	9/24/07	1210	Soil gas	x	x	
709528	VI-4-D	9/24/07	1309	Soil gas	x	x	
709528	VI-4-E	9/24/07	1524	Soil gas	x	x	
709557	VI-5-A	9/25/07	831	Soil gas	x	x	
709557	VI-5-B	9/25/07	924	Soil gas	x	x	
709557	VI-5-C	9/25/07	1204	Soil gas	x	x	
709557	VI-092507-FB	9/25/07	1344	Soil gas	x	x	
709576	VI-10-A	9/2/07	823	Soil gas	x	x	x
709576	VI-6-A	9/26/07	1147	Soil gas	x	x	x
709576	VI-12-4	9/26/07	1514	Soil gas	x	x	x
709608	VI-10-D	9/27/07	1026	Soil gas	x	x	x
709647	VI-11-A	9/28/07	939	Soil gas	x	x	x
709647	VI-11-A DUP	9/28/07	939	Soil gas	x	x	x
709647	VI-13-A	9/28/07	1241	Soil gas	x	x	x
709647	VI-092807-FB	9/28/07	1312	Soil gas	x	x	x
710035	VI-10-B1	10/1/07	1027	Soil gas	x		
710035	VI-10-C1	10/1/07	1002	Soil gas	x		
710035	VI-6-B1	10/1/07	1320	Soil gas	x		
710035	VI-6-C1	10/1/07	1401	Soil gas	x		
710142	VI-9-A	10/3/07	824	Soil gas	x	x	x
710142	VI-9-B	10/3/07	856	Soil gas	x	x	x
710142	VI-9-C	10/3/07	1058	Soil gas	x	x	x
710142	VI-8-C	10/3/07	1601	Soil gas	x	x	x
710169	VI-7-A	10/2/07	908	Soil gas	x	x	x
710169	VI-7-B	10/2/07	932	Soil gas	x	x	x
710169	VI-7-C	10/2/07	1144	Soil gas	x	x	x
710169	VI-7-C DUP	10/2/07	1144	Soil gas	x	x	x
710169	VI-7-D	10/2/07	1214	Soil gas	x	x	x
710169	VI-8-A	10/2/07	1435	Soil gas	x	x	x

TABLE 2-1

Summary of Field Duplicate Samples Sauget Area 2

SDG	Sample ID	Sample Date	Sample Time	Matrix	VOCs (TO-15)	VOC (TO-15 SIM)	Oxygen (Modified ASTM D-1946)
709528	VI-4-C	9/24/07	1210	Soil gas	x	x	
709528	VI-4-C DUP	9/24/07	1210	Soil gas	x	x	
709647	VI-11-A	9/28/07	939	Soil gas	x	x	x
709647	VI-11-A DUP	9/28/07	939	Soil gas	x	x	x
710169	VI-7-C	10/2/07	1144	Soil gas	x	x	x
710169	VI-7-C DUP	10/2/07	1144	Soil gas	x	x	x

TABLE 4-1

Data Review/Validation Qualifier Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
c	Calibration failure; poor (RRF) or unstable (%D) response	b	Instrument performance failure or poor chromatography	c	Calibration failure
d	MS/MSD or LCS/LCSD RPD imprecision	c	Calibration failure; poor or unstable (%D) response	d	MSIMSD or LCSILCSD RPD imprecision
e	Sample preservation or cooler temperature failure	d	MS/MSD or LCS/LCSD RPD imprecision	e	Sample preservatmon or cooler temperature failure
f	Field duplicate imprecision	e	Sample preservation or cooler temperature failure	f	Field duplicate imprecision
h	Holding time violation	f	Field duplicate imprecision	h	Holding time violation
j	Tuning Failure or poor mass spectrometer performance	g	Dual column confirmation imprecision	k	Laboratory duplicate imprecision
l	LCS recovery failure	h	Holding time violation	l	LCS recovery failure
m	MS/MSD recovery failure	l	LCS recovery failure	m	MS/MSD recovery failure
n	Internal standard failure	m	MS/MSD recovery failure	n	ICP interference check sample failure
p	Air bubble (> 6 mm or ¼ inch) in VOC vials	p	Air bubble (>6 mm or 1/4 inch) in VOC vials	o	Calibration blank contamination
q	Concentration exceeded the linear range	q	Concentration exceeded the linear range	p	Preparation blank contamination
r	linearity (%RSD or r) failure in initial calibration	r	Lincarity (%RSD or r) failure in initial calibration	q	Concentration exceeded the linear range
s	Surrogate failure	s	Surrogate failure	r	Linearity failure in calibration or MSA
t	Tentatively identified Compound	u	No confirmation column	s	Serial dilution failure
w	Identification criteria failure	w	Identification criteria failure	v	Post-digestion spike failure
x	Field and/or equipment blank contamination	x	Field and/or equipment blank contamination	w	CRDL standard recovery failure
y	Trip blank contamination	y	Trip blank contamination	x	Field and/or equipment blank contamination
z	Method blank and/or storage blank contamination	z	Method blank and/or storage blank contamination	z	Laboratory storage blank contamination
Q	Other — see bottom of data report for explanation	Q	Other — see bottom of data report for explanation	Q	Other - see bottom of data report for explanation

The reason code indicates the type of quality control failure that lead to the application of the data validation flag.

TABLE 6-1

Summary of Qualifications for SDG 709432

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
709432	VI-2-D	TO-15	4-Ethyltoluene	U	X	-
709432	VI-2-B	TO-15	2-Butanone	U	X	-
709432	VI-2-B	TO-15	Benzene	U	X	-

Notes:

Dashed lines indicate a new RL was not required

U = Non-detect

X = Field Blank Contamination

TABLE 6-2

Summary of Qualifications for SDG 709494

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
709494	VI-4-A	TO-15	Freon 12	UJ	L	-
709494	VI-4-B	TO-15	Freon 12	UJ	L	-
709494	VI-3-A	TO-15	Freon 12	J	L	-

Notes:

Dashed lines indicate a new RL was not required

J = Estimated

L = Low LCS Recovery

UJ = Estimated non-detect

TABLE 6-3

Summary of Qualifications for SDG 709528

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
709528	VI-3-B	TO-15	Freon 12	J	L	-
709528	VI-3-C	TO-15	Freon 12	UJ	L	-
709528	VI-4-C	TO-15	Freon 12	J	L	-
709528	VI-4-C DUP	TO-15	Freon 12	J	L	-
709528	VI-4-D	TO-15	Freon 12	UJ	L	-
709528	VI-4-E	TO-15	Freon 12	UJ	L	-

Notes:

Dashed lines indicate a new RL was not required

J = Estimated

L = Low LCS Recovery

UJ = Estimated non-detect

TABLE 6-4

Summary of Qualifications for SDG 709557

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
709557	VI-5-A	TO-15	*m,p* -Xylene	U	X	-
709557	VI-5-A	TO-15	4-Ethyltoluene	U	X	-
709557	VI-5-B	TO-15	2-Butanone	U	X	-
709557	VI-5-C	TO-15	2-Butanone	U	X	-
709557	VI-5-C	TO-15	*m,p* -Xylene	U	X	-
709557	VI-5-C	TO-15	*o* -Xylene	U	X	-
709557	VI-5-C	TO-15	4-Ethyltoluene	U	X	-
709557	VI-5-C	TO-15	1,2,4-Trimethylbenzene	U	X	-
709557	VI-5-C	TO-15	Freon 114	J	S	-
709557	VI-5-C	TO-15	Chloroethane	J	S	-
709557	VI-5-C	TO-15	Ethanol	J	S	-
709557	VI-5-C	TO-15	Acetone	J	S	-
709557	VI-5-C	TO-15	Methyl tert-butyl ether	J	S	-
709557	VI-5-C	TO-15	Hexane	J	S	-
709557	VI-5-C	TO-15	1,1-Dichloroethane	J	S	-
709557	VI-5-C	TO-15	cis-1,2-Dichloroethene	J	S	-
709557	VI-5-C	TO-15	Cyclohexane	J	S	-
709557	VI-5-C	TO-15	Heptane	J	S	-
709557	VI-5-C	TO-15	Toluene	J	S	-
709557	VI-5-C	TO-15	Tetrachloroethane	J	S	-
709557	VI-5-C	TO-15 SIM	Trichloroethene	J	S	-

Notes:

Dashed lines indicate a new RL was not required

J = Estimated

S = High Surrogate Recovery

U = Non-detect

X = Field Blank Contamination

TABLE 6-5

Summary of Qualifications for SDG 709576

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
709576	VI-12-A	TO-15	1,2-Dichlorobenzene	J	C	-
709576	VI-10-A	TO-15	alpha-Chlorotoluene	UJ	C	-
709576	VI-10-A	TO-15	Methyl tert-butyl ether	UJ	C	-
709576	VI-6-A	TO-15	alpha-Chlorotoluene	UJ	C	-
709576	VI-6-A	TO-15	Methyl tert-butyl ether	UJ	C	-
709576	VI-12-A	TO-15	Ethanol	UJ	C	-
709576	VI-12-A	TO-15	Methyl tert-butyl ether	UJ	C	-
709576	VI-10-A	TO-15	2-Butanone	J	C	-
709576	VI-6-A	TO-15	2-Butanone	UJ	C	-

Notes:

Dashed lines indicate a new RL was not required

C = Initial or continuing calibration %D or %RSD outside evaluation criteria

J = Estimated

UJ = Estimated non-detect

TABLE 6-6

Summary of Qualifications for SDG 709608

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
709608	No Qualifications					

TABLE 6-7

Summary of Qualifications for SDG 709647

SDG	Sample ID	Analysis	Analyte	URS Qual.	Code	New RL
709647	VI-11-A	TO-15	Acetone	U	X	-
709647	VI-11-A	TO-15	2-Butanone	U	X	-
709647	VI-11-A	TO-15	*m,p*-Xylene	U	X	-
709647	VI-13-A	TO-15	2-Butanone	U	X	-
709647	VI-13-A	TO-15	Benzene	U	X	-
709647	VI-13-A	TO-15	*m,p*-Xylene	U	X	-

Notes:

Dashed lines indicate a new RL was not required

U = Non-detect

X = Field Blank Contamination

TABLE 6-8

Summary of Qualifications for SDG 710035

SDG	Sample ID	Analysis	Analyte	URS Qual	Code	New RL
710035	No Qualifications					

TABLE 6-9

Summary of Qualifications for SDG 710142

SDG	Sample ID	Analysis	Analyte	URS Qual	Code	New RL
710142	No Qualifications					

TABLE 6-10

Summary of Qualifications for SDG 710169

SDG	Sample ID	Analysis	Analyte	URS Qual	Code	New RL
710169	No Qualifications					

TABLE 6-11

Summary of Qualifications for SDG 710169

SDG	Sample ID	Analysis	Analyte	URS Qual	Code	New RL
709432	VI-2-D	TO-15	4-Ethyltoluene	U	X	-
709432	VI-2-B	TO-15	2-Butanone	U	X	-
709432	VI-2-B	TO-15	Benzene	U	X	-
709494	VI-4-A	TO-15	Freon 12	UJ	L	-
709494	VI-4-B	TO-15	Freon 12	UJ	L	-
709494	VI-3-A	TO-15	Freon 12	J	L	-
709528	VI-3-B	TO-15	Freon 12	J	L	-
709528	VI-3-C	TO-15	Freon 12	UJ	L	-
709528	VI-4-C	TO-15	Freon 12	J	L	-
709528	VI-4-C DUP	TO-15	Freon 12	J	L	-
709528	VI-4-D	TO-15	Freon 12	UJ	L	-
709528	VI-4-E	TO-15	Freon 12	UJ	L	-
709557	VI-5-A	TO-15	*m,p*-Xylene	U	X	-
709557	VI-5-A	TO-15	4-Ethyltoluene	U	X	-
709557	VI-5-B	TO-15	2-Butanone	U	X	-
709557	VI-5-C	TO-15	2-Butanone	U	X	-
709557	VI-5-C	TO-15	*m,p*-Xylene	U	X	-
709557	VI-5-C	TO-15	*o*-Xylene	U	X	-
709557	VI-5-C	TO-15	4-Ethyltoluene	U	X	-
709557	VI-5-C	TO-15	1,2,4-Trimethylbenzene	U	X	-
709557	VI-5-C	TO-15	Freon 114	J	S	-
709557	VI-5-C	TO-15	Chloroethane	J	S	-
709557	VI-5-C	TO-15	Ethanol	J	S	-
709557	VI-5-C	TO-15	Acetone	J	S	-
709557	VI-5-C	TO-15	Methyl tert-butyl ether	J	S	-
709557	VI-5-C	TO-15	Hexane	J	S	-
709557	VI-5-C	TO-15	1,1-Dichloroethane	J	S	-
709557	VI-5-C	TO-15	cis-1,2-Dichloroethene	J	S	-
709557	VI-5-C	TO-15	Cyclohexane	J	S	-
709557	VI-5-C	TO-15	Heptane	J	S	-
709557	VI-5-C	TO-15	Toluene	J	S	-
709557	VI-5-C	TO-15	Tetrachloroethane	J	S	-
709557	VI-5-C	TO-15 SIM	Trichloroethene	J	S	-
709576	VI-12-A	TO-15	1,2-Dichlorobenzene	J	C	-
709576	VI-10-A	TO-15	alpha-Chlorotoluene	UJ	C	-
709576	VI-10-A	TO-15	Methyl tert-butyl ether	UJ	C	-
709576	VI-6-A	TO-15	alpha-Chlorotoluene	UJ	C	-
709576	VI-6-A	TO-15	Methyl tert-butyl ether	UJ	C	-
709576	VI-12-A	TO-15	Ethanol	UJ	C	-
709576	VI-12-A	TO-15	Methyl tert-butyl ether	UJ	C	-
709576	VI-10-A	TO-15	2-Butanone	J	C	-
709576	VI-6-A	TO-15	2-Butanone	UJ	C	-
709647	VI-11-A	TO-15	Acetone	U	X	-
709647	VI-11-A	TO-15	2-Butanone	U	X	-
709647	VI-11-A	TO-15	*m,p*-Xylene	U	X	-
709647	VI-13-A	TO-15	2-Butanone	U	X	-
709647	VI-13-A	TO-15	Benzene	U	X	-
709647	VI-13-A	TO-15	*m,p*-Xylene	U	X	-

Notes:

Dashed lines indicate a new RL was not required

C = Initial or continuing calibration %D or %RSD outside evaluation criteria

J = Estimated

L = Low LCS Recovery

S = High Surrogate Recovery

SIM = Selected Ion Monitoring

U = Non-detect

UJ = Estimated non-detect

X = Field Blank Contamination

Appendix A

TABLE A-1

Analytical Results SDGs 709432 - 710169

SDG	Sample ID	Matrix	Parameter	Chemical	Result (µg/m^3)	URS Qual, Code	RL (µg/m^3)
709432	VI-2-D	Soil Gas	TO-15	4-Ethyltoluene	3.7	U,X	3.7
709432	VI-2-B	Soil Gas	TO-15	2-Butanone	1.2	U,X	1.2
709432	VI-2-B	Soil Gas	TO-15	Benzene	1.3	U,X	1.3
709494	VI-4-A	Soil Gas	TO-15	Freon 12	7.8	UJ,L	7.8
709494	VI-4-B	Soil Gas	TO-15	Freon 12	5.5	UJ,L	5.5
709494	VI-3-A	Soil Gas	TO-15	Freon 12	1.5	J,L	0.84
709528	VI-3-B	Soil Gas	TO-15	Freon 12	5.9	J,L	2.0
709528	VI-3-C	Soil Gas	TO-15	Freon 12	2.0	UJ,L	2.0
709528	VI-4-C	Soil Gas	TO-15	Freon 12	7.5	J,L	3.8
709528	VI-4-C DUP	Soil Gas	TO-15	Freon 12	8.6	J,L	8
709528	VI-4-D	Soil Gas	TO-15	Freon 12	5.3	UJ,L	5.3
709528	VI-4-E	Soil Gas	TO-15	Freon 12	0.81	UJ,L	0.81
709557	VI-5-A	Soil Gas	TO-15	*m,p*-Xylene	1.8	U,X	1.8
709557	VI-5-A	Soil Gas	TO-15	4-Ethyltoluene	2.1	U,X	2.1
709557	VI-5-B	Soil Gas	TO-15	2-Butanone	4.6	U,X	4.6
709557	VI-5-C	Soil Gas	TO-15	2-Butanone	0.55	U,X	0.55
709557	VI-5-C	Soil Gas	TO-15	*m,p*-Xylene	0.81	U,X	0.81
709557	VI-5-C	Soil Gas	TO-15	*o*-Xylene	0.81	U,X	0.81
709557	VI-5-C	Soil Gas	TO-15	4-Ethyltoluene	0.92	U,X	0.92
709557	VI-5-C	Soil Gas	TO-15	1,2,4-Trimethylbenzene	0.92	U,X	0.92
709557	VI-5-C	Soil Gas	TO-15	Freon 114	3.2	J,S	1.3
709557	VI-5-C	Soil Gas	TO-15	Chloroethane	0.64	J,S	0.49
709557	VI-5-C	Soil Gas	TO-15	Ethanol	23 J	J,S	1.8
709557	VI-5-C	Soil Gas	TO-15	Acetone	85	J,S	2.2
709557	VI-5-C	Soil Gas	TO-15	Methyl tert-butyl ether	38 J	J,S	0.67
709557	VI-5-C	Soil Gas	TO-15	Hexane	82	J,S	0.66
709557	VI-5-C	Soil Gas	TO-15	1,1-Dichloroethane	18	J,S	0.76
709557	VI-5-C	Soil Gas	TO-15	cis-1,2-Dichloroethene	3.1	J,S	0.74
709557	VI-5-C	Soil Gas	TO-15	Cyclohexane	20	J,S	0.64
709557	VI-5-C	Soil Gas	TO-15	Heptane	14	J,S	0.77
709557	VI-5-C	Soil Gas	TO-15	Toluene	100	J,S	0.7
709557	VI-5-C	Soil Gas	TO-15	Tetrachloroethane	1.5	J,S	1.3
709557	VI-5-C	Soil Gas	TO-15 SIM	Trichloroethene	0.48	J,S	0.2
709576	VI-12-A	Soil Gas	TO-15	1,2-Dichlorobenzene	5.7	J,C	0.97
709576	VI-10-A	Soil Gas	TO-15	alpha-Chlorotoluene	1500	UJ,C	1500
709576	VI-10-A	Soil Gas	TO-15	Methyl tert-butyl ether	1100	UJ,C	1100
709576	VI-6-A	Soil Gas	TO-15	alpha-Chlorotoluene	8.8	UJ,C	8.8
709576	VI-6-A	Soil Gas	TO-15	Methyl tert-butyl ether	6.2	UJ,C	6.2
709576	VI-12-A	Soil Gas	TO-15	Ethanol	1.5	UJ,C	1.5
709576	VI-12-A	Soil Gas	TO-15	Methyl tert-butyl ether	0.58	UJ,C	0.58
709576	VI-10-A	Soil Gas	TO-15	2-Butanone	7000	J,C	880
709576	VI-6-A	Soil Gas	TO-15	2-Butanone	5	UJ,C	5
709647	VI-11-A	Soil Gas	TO-15	Acetone	3.8	U,X	3.8
709647	VI-11-A	Soil Gas	TO-15	2-Butanone	0.95	U,X	0.95
709647	VI-11-A	Soil Gas	TO-15	*m,p*-Xylene	1.4	U,X	1.4
709647	VI-13-A	Soil Gas	TO-15	2-Butanone	0.46	U,X	0.46
709647	VI-13-A	Soil Gas	TO-15	Benzene	0.5	U,X	0.5
709647	VI-13-A	Soil Gas	TO-15	*m,p*-Xylene	0.69	U,X	0.69

Notes:

Dashed lines indicate a new RL was not required

µg/m^3 = micrograms per cubic meters

C = Initial or continuing calibration %D or %RSD outside evaluation criteria

J = Estimated

L = Low LCS Recovery

S = High Surrogate Recovery

SIM = Selected Ion Monitoring

U = Non-detect

UJ = Estimated non-detect

X = Field Blank Contamination

Appendix B

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Page ____ of ____

Project Manager Bob Veenstra
Collected by: (Print and Sign) Sherry Moore Sherry Moore
Company URS Email
Address 1001 Highlands Plaza Dr City St. Louis State MO Zip 63110
Phone 314-429-0100 Fax 314-429-0462

Project Info:
P.O. #
Project # 21561685
Project Name SA2

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by: [illegible]
Date: 9/21/07
Pressurization Gas: (N2) He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psig)
01A	VI-2-B	00000251	9-19-07	0929	TO-15	30	5	4.5	5
02A	VI-091907-FB	00000 1098	9-19-07	1042	TO-15	30	5	2.5	
03A	VI-2-D	00000 3385	9-19-07	1505	TO-15	30	5	3.5	

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Sherry Moore	9-19-07/1705	Monica Brogan ATL	9/20/07 8:30
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx	8606 3891 9439	NA	Good	Yes No (None)	0709432

Form 1293 rev. 11

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
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180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Page 1 of 1

0364

Project Manager Bob Verastra
Collected by: (Print and Sign) Shirley Hose
Company URS Corp Email
Address 1001 Highlandplaza Dr City St. Louis State MO Zip 63110
Phone 314-429-0100 Fax 314-429-0462

Project Info:
P.O. #
Project # 21561683
Project Name SAZ

Turn Around Time:
☐ Normal
☐ Rush
specify

Lab Use Only
Pressurized by: RD
Date: 9/24/07
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	VI-4-A	00002025	9-21-07	0838	TO-15	30	5	4.5	5.0
02A	VI-4-B	01365L		1007	TO-15	30	5	4.0	
03A	VI-092107-FB	00001101		1022	TO-15	30	5	4.5	
04A	VI-3-A	00003517		1412	TO-15	30	5	4.0	

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time 9/24/07 0830
Notes:

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Lab Use Only	Shipper Name	Air Bill #	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx	860638919504	NA	good	Yes No (None)	0709494

Form 1283 rev.11

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

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(916) 985-1000 FAX (916) 985-1020

Page 1 of 1

0498

Project Manager Bob Veenstra
Collected by: (Print and Sign) Sherry Moore Sherry Moore
Company URS Corp Email
Address 1001 Highlands Plaza Dr. City St. Louis State MO Zip 63110
Phone 314-429-0100 Fax 314-429-0462

Project Info:
P.O. #
Project # 21521683
Project Name SAZ

Turn Around Time:
☑ Normal
☐ Rush
specify

Lab Use Only
Pressurized by: VAR
Date: 9/26/07
Pressurization Gas: N He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psig)
01A	VI-3-B	00000247	9-24-07	0846	TO-15	30	5	5.0 "Hg	5.0 psig
02A	VI-3-C	00000591		0934		27	5	5.0 "Hg	
03A	VI-4-C	00000965		1210		30	5	3.5 "Hg	
04A	VI-4-C DUP	436		1210		30	5	5.0 "Hg	
05A	VI-4-D	00000963		1309		30	5	5.0 "Hg	
06A	VI-4-E	00000288		1524		30	5	5.5 "Hg	

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time	Notes:
Sherry Moore	9-24-07 1700	Monica Green AIL	9/25/07 845	
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time	
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time	

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed Ex	860638919467	N/A	Good	Yes No (None)	0709528

Form 1005 rev.11

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

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Page 1 of 1

0356

Project Manager Bob Veenstra
Collected by: (Print and Sign) Sherry Moore / Sherry Moore
Company URS Corp. Email
Address 1001 Highlands Plaza Dr. City St. Louis State MO Zip 63110
Phone 314-429-0100 Fax 314-429-0462

Project Info:
P.O. #
Project # 21561683
Project Name SA2

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by: B
Date: 9/25/07
Pressurization Gas: (N2) He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final
01A	VI-5-A	00000300	9-25-07	0831	TO-15	24.5	5	6.0	5.0
02A	VI-5-B	00000893	↓	0924	↓	30	5	4.0	↓
03A	VI-5-C	00001544	↓	1204	↓	30	8	9.5	↓
04A	VI-092504-FB	00000342	↓	1344	↓	28.5	5	5.0	↓

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	9-25-07 / 1630	Monica Wiegen ATL	9/26/07 840
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed Ex	8602 3891 9278	MA	Good	Yes No (None)	0709557

Form 1293 rev.11

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

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180 BLUE RAVINE ROAD, SUITE B
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(916) 985-1000 FAX (916) 985-1020

Project Manager: Bob Veenstra
Collected by: (Print and Sign) Sherry Moore
Company: URS Corp Email:
Address: 1001 Highlands Plaza City: St. Louis State: MO Zip: 63110
Phone: 314-429-0100 Fax: 314-429-0462

Project Info:
P.O. #:
Project #: 21561683
Project Name: SAZ

Turn Around Time:
[X] Normal
[ ] Rush
specify

Lab Use Only
Pressurized by: VH
Date: 9/28/07
Pressurization Gas: (N2) He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	VI-1D-A	00000244	9/26/07	0823	TO-15 (Oxygen)	30	4	3.0	5.0
	~~VI-1D-B~~ 9-27-07	00000465							
02A	VI-6-A	00000308	9/26/07	1147	TO-15 (Oxygen)	30	8	6.5	5.0
03A	VI-12-A	94300	↓	1514	TO-15 (Oxygen)	30	6	5.0	✓

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	9/26/07 1700	Monica Gregen ATL	830 9/27/07
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed Ex	8606389192189	MA	Good	Yes No (None)	070957B

Form 1287 rev 11

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

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(916) 985-1000 FAX (916) 985-1020

Project Manager Bob Vanstra

Collected by: (Print and Sign) Sherry Moore

Company URS Email

Address 1001 Highlands Pl City St. Louis State MO Zip 63110

Phone 314-429-0100 Fax

Project Info:
P.O. #
Project # 21561683
Project Name

Turn Around Time:
X Normal
☐ Rush
specify

Lab Use Only
Pressurized by: VH2
Date: 9/29/07
Pressurization Gas: (N2) He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psig)
01A	VI-10-D	00000818	9-27-07	1026	TO-15 (+ 04)	30	8	7.0 "Hg	5.0 psi

Relinquished by: (signature) Sherry Moore Date/Time 9-27-07 1600
Received by: (signature) Monica Bregen ATL Date/Time 9/28/07 845

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx	8606 3891 9290	MA	Good	Yes No (None)	0709608

Form 1283 rev 1

Air Toxics LTD.

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Project Manager Bob Veenstra
Collected by: (Print and Sign) Sherry Moore / Sherry Moore
Company URS Corp. Email
Address 1001 Highlands Plaza City St. Louis State MO Zip 63110
Phone 314-429-0100 Fax 314-429-0462

Project Info:
P.O. #
Project # 26561683
Project Name SA-2

Turn Around Time:
[X] Normal
[ ] Rush
specify

Lab Use Only
Pressurized by: RD
Date: 10/4/07
Pressurization Gas: (N2) He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	VI-11-A	00000314?	9-28-07	0939	TO-15 (~~TO-3/4~~)	30	5	5.0	5.0
02A	VI-11-A DUP	4588	↓	0939	TO-15	30	5	5.0	
03A	VI-13-A	12671		1241		30	5	4.5	
04A	VI-092807-FB	00000372	↓	1312	↓	30	5	5.5	↓

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Sherry Moore	9-28-07 1700	[illegible]	9/29/07 900
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fedex	860638919456	NA	good	Yes No (None)	0709647

Form.1293 rev.11

Air Toxics LTD.

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FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Page 1 of 1

0381

Project Manager Bob Veenstra
Collected by: (Print and Sign) Sherry Moore Sherry Moore
Company URS Email
Address 1001 Highlands Plaza Dr City St Louis State MO Zip 63110
Phone Fax

Project Info:
P.O. #
Project # 26611683
Project Name SA2

Turn Around Time:
☐ Normal
☒ Rush 5-DAY (specify)

Lab Use Only
Pressurized by: VKR
Date: 10/2/07
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt Final (psig)
01A	VI-1D-B1	356	10-1-07	1027	TO-15 Quad	30	5	4.0"Hg/5.0psi
02A	VI-1D-C1	00002167		1002		30	5	4.5"Hg
03A	VI-6-B1	00002176		1320		29	5	6.0"Hg
04A	VI-6-C1	00000547	↓	1401	↓	28	5	6.0"Hg

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Sherry Moore	10-1-07 1430	Monica Giesen AM	10/2/07 845
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed Ex	862325400481	NA	Good	Yes No (None)	0710035

Form 1298 rev 11

Air Toxics LTD.

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Project Manager Bob Veenstra

Collected by: (Print and Sign) Sherry Moore Sherry Moore

Company URS Corp Email

Address 100 Highlands Plaza City St. Louis State MO Zip 63110

Phone 314-429-0100 Fax 314-429-0462

Project Info:
P.O. #
Project # 21561683
Project Name

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by: VFR
Date: 10/5/07
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psig)
01A	VI-9-A	00000334	10-3-07	0824	TO-15 LLSIM / ASTM D-1946	30	5	4.5 Hg	5.0 psi
02A	VI-9-B	00000263	↓	0856	↓	26.5	5	7.5 Hg	↓
03A	VI-9-C	00000346		1058		30	8	8.0 Hg	
04A	VI-8-C	00000259		1601		30	8	7.5 Hg	✓

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Sherry Moore	10-3-07 1700	Anne Wright AIR	10/4/07 0835
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp. (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed-X	8632 0416 8176	NA	Good	Yes No None	0710142

Form 1235 rev.11

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Project Manager Bob Vaughn
Collected by: (Print and Sign) Sherry Moon
Company URS Corp Email
Address 100 Highlands Plaza Dr. City St. Louis State MO Zip 63110
Phone 314-429-0100 Fax 314-429-0462

Project Info:
P.O. #
Project # 21560683
Project Name

Turn Around Time:
☒ Normal
☐ Rush
Specify

Lab Use Only
Pressurized by: VFR
Date: 10/5/07
Pressurization Gas: N He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final
01A	VI-7-A	00003055	10-2-07	0908	TO-15 LL SIM / ASTM D-1946	30	5	5.0	5.0
02A	VI-7-B	00003143		0932		30	5	3.5	
03A	VI-7-C	23924		1144		30	5	5.5	
04A	VI-7-C DUP	00003140		1144		30	5	4.0	
05A	VI-7-D	00003105		1214		30	5	3.5	
06A	VI-8-A	34220		1435		30	8.5	6.0	

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Sherry Moon	10-2-07 1700	Diane E White-FED	10/4/07 0835
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FEDEX	8632 0414 8716	NA	Good	Yes No None	0710142 AS 10/5/07

0710169

Form 1208 rev.11

DATA VALIDA..ON WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Steve Gragert	**Project Name:**	Sauget - Area 2 Air Sampling
Date:	11/13/2007	**Project Number:**	21561683.80012
Laboratory	Air Toxics	**SDG No.:**	0709432
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

Samples were qualified "U" due to field blank contaminaton.

Field IDs:

VI-2-B
VI-091907-FB
VI-2-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note: No issues were noted in the laboratory case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If sample preservation and/or temperature was inappropriate (i.e., <2 °C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R"			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field Blank VI-091907-FB had detections of the following analytes (in µg/m³): Chloromethane (0.32), Ethanol (2.8), Acetone (13), 2-Butanone (9.8), Benzene (0.51), Toluene (2.8), m,p-Xylene (2.4), 4-Ethyltoluene (0.85), 1,2,4-Trimethylbenzene (0.90), and Oxygen (20%). Professional judgment was used to not qualify Oxygen due to the fact it is naturally occuring in the air. Analytes that required qualification due to Field Blank detections are located in the table below:

Field ID	Analyte(s)	Qualification	Code	Batch #	Justification
VI-2-D	4-Ethyltoluene	U	X	y092515.d	Field Blank contamination
VI-2-B	2-Butanone	U	X	y092515.d	Field Blank contamination
VI-2-B	Benzene	U	X	y092515.d	Field Blank contamination

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?	x		
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	x		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial		x	
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be			x

Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, R\ Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within evaluation criteria.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%
	Positive	J	J	J
	Non-detect	None	UJ	R
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	3			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer: Steve Gragert
Date: 11/13/2007
Laboratory Severn Trent Laboratory - Savannah

Project Name: Sauget - Area 2 Air Sampling
Project Number: 21561683.80012
SDG No.: 0709494
Review Level: Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

Samples were qualified "**J/UJ**" due to low LCS recovery.

Field IDs:

VI-4-A
VI-4-B
VI-092107-FB
VI-3-A

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?		x	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: The laboratory case narrative indicated the COC was not signed by the field sampler. Chain of custody was not relinquished properly. URS was notified of the discrepancy. The laboratory indicated the cooler arrived with custody seals intact and all samples were recived in good condition. No qualification of data was required. No other issues were noted in the laboratory case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field Blank VI-092107-FB had a detection of Oxygen (20%). Professional judgment was used to not qualify Oxygen due to the fact it is naturally occuring in the air.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x

Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: Dichlorodifluoromethane (Freon 12) had a LCS recovery (62%) outside of evaluation criteria (70-130%). Analytes that required qualification due to LCS recoveries are located in the table below:

Field ID	Analyte(s)	Qualification	Code	Batch #	Justification
VI-4-A	Freon 12	UJ	L	t14l0921b	Low LCS recovery
VI-4-B	Freon 12	UJ	L	t14l0921b	Low LCS recovery
VI-3-A	Freon 12	J	L	t14l0921b	Low LCS recovery

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%
	Positive	J	J	J
	Non-detect	None	UJ	R
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	4			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Steve Gragert	**Project Name:**	Sauget - Area 2 Air Sampling
Date:	11/14/2007	**Project Number:**	21561683.80012
Laboratory	Air Toxics	**SDG No.:**	0709528
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

Samples were qualified "J/UJ" due to low LCS recovery.

Field IDs:

VI-3-B	VI-4-D
VI-3-C	VI-4-E
VI-4-C	VI-4-C DUP

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No issues were noted in the laboratory case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blank criteria were met.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x

Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: Dichlorodifluoromethane (Freon 12) had a LCS recovery (62%) outside of evaluation criteria (70-130%). Analytes that required qualification due to LCS recoveries are located in the table below:

Field ID	Analyte(s)	Qualification	Code	Batch #	Justification
VI-3-B	Freon 12	J	L	t1410921b	Low LCS recovery
VI-3-C	Freon 12	UJ	L	t1410921b	Low LCS recovery
VI-4-C	Freon 12	J	L	t1410921b	Low LCS recovery
VI-4-C DUP	Freon 12	J	L	t1410921b	Low LCS recovery
VI-4-D	Freon 12	UJ	L	t1410921b	Low LCS recovery
VI-4-E	Freon 12	UJ	L	t1410921b	Low LCS recovery

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100% / Area < -50% / Area < -10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x		x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Sample VI-4-C-DUP was the field duplicate for sample VI-4-C.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALID. N WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Steve Gragert	**Project Name:**	Sauget - Area 2 Air Sampling
Date:	11/14/2007	**Project Number:**	21561683.80012
Laboratory	Air Toxics	**SDG No.:**	0709557
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

Samples were qualified "U" due to field blank contamination. Samples were also qualified "J" due to high surrogate recovery.

Field IDs:

VI-5-A
VI-5-B
VI-5-C
VI-092507-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: The laboratory case narrative inidacted surrogate recovery was outside evaluation criteria for TO-15 full scan and TO-15 SIM. No other issues were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field Blank VI-092507-FB had detections of the following analytes (in µg/m^3): Ethanol (1.8), Acetone (13), 2-Butanone (10), Benzene (0.58), Toluene (2.0), m,p-Xylene (1.4), o-Xylene (0.70), 4-Ethyltoluene (0.98), and 1,2,4-Trimethylbenzene (1.5).

Analytes that required qualification due to Field Blank detections are located in the table below:

Field ID	Analyte(s)	Qualification	Code	Batch #	Justification
VI-5-A	m&p-Xylene	U	X	t14l0921b	Field Blank contamination
VI-5-A	4-Ethyltoluene	U	X	t14l0921b	Field Blank contamination
VI-5-B	2-Butanone	U	X	t14l0921b	Field Blank contamination
VI-5-C	2-Butanone	U	X	t14l0921b	Field Blank contamination
VI-5-C	m&p-Xylene	U	X	t14l0921b	Field Blank contamination
VI-5-C	o-Xylene	U	X	t14l0921b	Field Blank contamination
VI-5-C	4-Ethyltoluene	U	X	t14l0921b	Field Blank contamination
VI-5-C	1,2,4-Trimethylbenzene	U	X	t14l0921b	Field Blank contamination

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?		x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)		x	

Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: In sample VI-5-C, the surrogate 1,2-Dichloroethane-d4 had a recovery (193%) outside of evaluation criteria (70-130%) in both full scan and SIM.

Analytes that required qualification due to surrogate recovery are located in the table below:

Field ID	Analyte(s)	Qualification	Code	Batch #	Justification
VI-5-C	All TO-15 full scan detections	J	S	y100315	High surrogate recovery
VI-5-C	All TO-15 SIM detections	J	S	a100410	High surrogate recovery

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, ... D - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within evaluation criteria.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%
	Positive	J	J	J
	Non-detect	None	UJ	R
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	4			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDA ›N WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Steve Gragert	**Project Name:**	Sauget - Area 2 Air Sampling
Date:	11/14/2007	**Project Number:**	21561683.80012
Laboratory	Air Toxics	**SDG No.:**	0709576
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

No analytes required qualification based on this data review.

Field IDs:

VI-10-A
VI-6-A
VI-12-A

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: The laboratory case narrative and cooler receipt form did not indicate any problems.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blank criteria were met.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within evaluation criteria.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
	Area > +100% / Area < -50% / Area < -10%			
	Positive: J / J / J			
	Non-detect: None / UJ / R			
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	3			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Steve Gragert	**Project Name:**	Sauget - Area 2 Air Sampling
Date:	11/14/2007	**Project Number:**	21561683.80012
Laboratory	Air Toxics	**SDG No.:**	0709608
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

No analytes required qualification based on this data review.

Field IDs: VI-10-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No issues were noted in the laboratory case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blank criteria were met.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within evaluation criteria.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%
	Positive	J	J	J
	Non-detect	None	UJ	R
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	1			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDA. .N WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer: Steve Gragert
Date: 11/14/2007
Laboratory Air Toxics

Project Name: Sauget - Area 2 Air Sampling
Project Number: 21561683.80012
SDG No.: 0709647
Review Level: Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

Samples were qualified "**U**" due to field blank contamination.

Field IDs:

VI-11-A
VI-11-A DUP
VI-13-A
VI-092807-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: The laboratory case narrative and cooler receipt form did not indicate any problems.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	x		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: Field Blank VI-092807-FB had detections of the following analytes (in $\mu g/m^3$): Ethanol (1.6), Acetone (11), 2-Butanone (6.4), Benzene (0.61), Toluene (2.1), m,p-Xylene (1.2) and Oxygen (20%). Professional judgment was used to not qualify Oxygen due to the fact it is naturally occuring in air.

Analytes that required qualification due to field blank detections are located in the table below:

Field ID	Analyte(s)	Qualification	Code	Batch #	Justification
VI-11-A	Acetone	U	X	y100926	Field Blank contamination
VI-11-A	2-Butanone	U	X	y100926	Field Blank contamination
VI-11-A	m&p-Xylene	U	X	y100926	Field Blank contamination
VI-13-A	2-Butanone	U	X	y100926	Field Blank contamination
VI-13-A	Benzene	U	X	y100926	Field Blank contamination
VI-13-A	m&p-Xylene	U	X	y100926	Field Blank contamination

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x

Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, J - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS for TO-15 Full Scan had a LCS recovery (171%) outside of evaluation criteria (70-130%). All associated samples were non-detect. No qualification of data was required.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%
	Positive	J	J	J
	Non-detect	None	UJ	R
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Sample VI-11-A DUP was a field duplicate of sample VI-11-A

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	4			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALIDATION WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Steve Gragert	**Project Name:**	Sauget - Area 2 Air Sampling
Date:	11/15/2007	**Project Number:**	21561683.80012
Laboratory	Air Toxics	**SDG No.:**	0710035
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

No analytes required qualification based on this data review.

Field IDs:

VI-10-B1
VI-10-C1
VI-6-B1
VI-6-C1

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note: No issues were noted in the laboratory case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blank criteria were met.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within evaluation criteria.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		

	Area > +100%	Area < -50%	Area < -10%
Positive	J	J	J
Non-detect	None	UJ	R

Note:	The method specification is for the continuing calibration to be compared to the mid-point initial			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	4			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALID. ON WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Steve Gragert	**Project Name:**	Sauget - Area 2 Air Sampling
Date:	11/15/2007	**Project Number:**	21561683.80012
Laboratory	Air Toxics	**SDG No.:**	0710142
		Review Level:	Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

No analytes required qualification based on this data review.

Field IDs:

VI-9-A
VI-9-B
VI-9-C
VI-8-C

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No issues were noted in the laboratory case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R"			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blank criteria were met.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x

Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within evaluation criteria.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%
	Positive	J	J	J
	Non-detect	None	UJ	R
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	4			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALID. ON WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer: Steve Gragert
Date: 11/15/2007
Laboratory Air Toxics

Project Name: Sauget - Area 2 Air Sampling
Project Number: 21561683.80012
SDG No.: 0710169
Review Level: Level III

Major Anomolies:

No samples were rejected

Minor Anomolies:

No analytes required qualification based on this data review.

Field IDs:

VI-7-B	VI-7-A
VI-7-C	VI-8-A
VI-7-C DUP	VI-7-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

Note: No issues were noted in the laboratory case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		x	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: All blank criteria were met.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
-	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within evaluation criteria.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%
	Positive	J	J	J
	Non-detect	None	UJ	R
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Sample VI-7-C DUP was a field duplicate of sample VI-7-C. Both samples were analyzed for TO-15 Full Scan and Oxygen.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note:

DATA VALID. JN WORKSHEET
VOLATILE ORGANIC ANALYSIS

Reviewer:	Steve Gragert	**Project Name:**	Sauget - Area 2 Air Sampling
Date:	11/15/2007	**Project Number:**	21561683.80012
Laboratory	Air Toxics	**SDG No.:**	0709576
		Review Level:	Level IV

Major Anomolies:

No samples were rejected

Minor Anomolies:

Samples were qualified "J/UJ" due to Initial and Continuing Calibration %RSDs and %Ds outside of evaluation criteria.

Field IDs:

VI-10-A
VI-6-A
VI-12-A

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note: The laboratory case narrative and cooler receipt form did not indicate any problems.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix: Air — Preserved: No — Holding Time: 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

Note: All holding time criteria were met.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	x		
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	x		
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	x		

Note: All instrument performance check criteria were met.

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)
(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?			x
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	x		

Note: All blank criteria were met.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	x		
5.2	Are CCCs linear applying either %RSD < 30% and all other compounds <30% or >0.990?		x	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).		x	
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	x		
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	x		

Note: For TO-15 Full Scan, all analytes had a %RSD < 30%, with the exception of 1,2-Dichlorobenzene (31%) in data package 0709576A, alpha-Chlorotoluene and MTBE (38%) in data package 0709576D, Qualifications based on ICAL %RSD are located in the table below:

Field ID	Analyte(s)	Qualification	Code	Batch #	Justification
VI-12-A	1,2-Dichlorobenzene	J	C	t14l0921b	ICAL %RSD >30%
VI-10-A	alpha-Chlorotoluene	UJ	C	t14q928b	ICAL %RSD >30%
VI-10-A	Methyl tert-butyl ether	UJ	C	t14q928b	ICAL %RSD >30%
VI-6-A	alpha-Chlorotoluene	UJ	C	t14q928b	ICAL %RSD >30%
VI-6-A	Methyl tert-butyl ether	UJ	C	t14q928b	ICAL %RSD >30%

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	x		
6.2	Has a continuing calibration standard been analyzed every 12 hours?	x		
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	x		
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D <30%)?	x		
	If yes, a marginal increase in response >30% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).		x	
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.	x		

Note: For TO-15 Full Scan, all analytes had a %D < 30%, with the exception of Ethanol (40%) and Methyl tert-butyl ether (33%) for data package 0709576A. In data package 0709576D, 2-Butanone (33%) and alpha-Chlorotoluene (36%) had %D > 30%. Qualifications based on CCAL %D are located in the table below. The compound alpha-chlorotoluene was previously qualified due to initial calibration in samples VI-10-A and VI-6-A, no additional qualification of data was required.

Field ID	Analyte(s)	Qualification	Code	Batch #	Justification
VI-12-A	Ethanol	UJ	C	t14l0921b	CCAL %D >30%
VI-12-A	Methyl tert-butyl ether	UJ	C	t14l0921b	CCAL %D >30%
VI-10-A	2-Butanone	J	C	t14q928b	CCAL %D >30%
VI-6-A	2-Butanone	UJ	C	t14q928b	CCAL %D >30%

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted			

	> UCL	10% to LCL	< 10%
Positive	J	J	J
Non-detect	None	UJ	R

Note: All surrogate recoveries were within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?			x
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples *from the same site/matrix*. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+			

Note: MS/MSD samples were not submitted for analysis.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, D - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <LCL, J(+)/UJ(-); <30% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: All LCS recoveries were within evaluation criteria.

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%
	Positive	J	J	J
	Non-detect	None	UJ	R
Note:	calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	x		

Note: All criteria were met.

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	x		
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	x		
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x	
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	x		

Note: All criteria were met.

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action: No qualifying action is taken based on field duplicate results, however the data validator should provide a qualitative assessment in the data validation report.			

Note: Field duplicate samples were not submitted for analysis.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous		x		
14.2	Number of samples:	3			
14.3	Number of target compounds in each analysis:	60			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	**100**			

Note: